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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,656	08/07/2001	Yoshihiko Okamoto		9695

7590 01/15/2002

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EXAMINER

BARRECA, NICOLE M

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 01/15/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/922,656

Applicant(s)

OKAMOTO ET AL.

Examiner

Nicole M. Barreca

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/478,023.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.

- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Claim 39 is pending in this application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 39 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. While the specification does disclose making a semiconductor device using a mask comprising a transparent mask substrate, a first opening portion (631a in figure 6G), an auxiliary light shielding region (631d) and an auxiliary opening region (631c), there is no disclosure to the phase of the auxiliary opening region being the same as that of the first opening region.

Allowable Subject Matter

4. Claim 39 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action.
5. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach or suggest a method for making a semiconductor device comprising the steps of irradiating a mask, reducing and projecting the light passing through the mask so that the circuit pattern can be focused onto the photosensitive resist film overlying the wafer, wherein the mask comprises a transparent mask substrate, a first opening region which corresponds to the reduced circuit pattern

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having an inner corner portion bordering on the vertex of the light shielding region and an outer corner portion bordering on the vertex of the first opening region, an auxiliary light shielding region which has a size smaller than the first opening region and reduces the light intensity at the inner corner portion in order to reduce the pattern deformation, and an auxiliary opening region which has a size smaller than the first opening region, enhances the light intensity at the outer corner portion in order to reduce the pattern deformation, and has a phase which is the same as that of the first opening region.

Okamoto (US Patent 5,045,417) discloses a method for manufacturing a semiconductor device using a mask comprising transmission region B and subtransmission regions C, which increase the light intensity at the four corners of the transmission region. Okamoto fails to teach or suggest an auxiliary shielding region for reducing the light intensity at a corner portion.

Nitayama (US Patent 5,234,780) discloses an exposure mask comprising a main light transmitting region located in the middle of the opening having a first optical path length and phase shift regions adjacent to a light shielding layer having a second optical path length which is different from the first optical path length. While Nitayama does disclose an auxiliary opening region, the phase of this auxiliary opening region is not the same as the phase of the (main) opening region. Nitayama also does not teach or suggest an auxiliary shielding region which reduces the light intensity at a corner portion.

JP 64-1233 discloses a mask used in the manufacture of a semiconductor device comprising a rectangular pattern 4, which includes shielding region 2a surrounded by

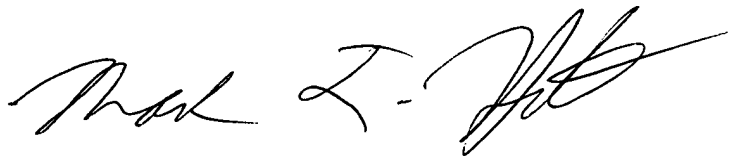
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transmitting section 3 and triangular cutouts which form auxiliary light transmitting regions 19. The auxiliary light transmitting regions prevent the corners of the rectangular pattern from being underexposed. JP 64-1233 however does not teach or suggest an auxiliary shielding region which has a size smaller than the first opening or transmission region.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole M. Barreca whose telephone number is 703-308-7968. The examiner can normally be reached on Monday-Thursday (8:00 am-6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



nmb *nh*
January 11, 2002

**MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700**